Regional Activity to Promote Integration through
Dialogue and Policy Implementation (RAPID)
REGIONAL MARKET INTEGRATION

RAPID

SUPPORT FOR TRANSPORT AND TELECOMMUNICATION REFORM IN SOUTHERN AFRICA: PROTOCOL IMPLEMENTATION

Task Order 2.1

TECHNICAL ASSESSMENT REPORT:

BOTSWANA RAILWAYS

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Submitted by:
Chemonics International

Submitted to:

**Regional Centre for Southern Africa,
U.S. Agency for International Development**

Gaborone, Botswana

November 2000

USAID

**A Project Funded by the United States Agency for International Development
(Contract No. 690-I-00-00-00149-00)**

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1. BOTSWANA RAILWAYS REVIEW

Botswana Railways (BR) is the parastatal railway operating through Botswana. The mainline core route runs north –south, passing from the border south of Mafikeng, through Gaborone, Mahalapye, Serule, and Francistown to Plumtree. Its connections are to Spoornet to the south and to NRZ to the north. It has no northerly connection to Zambia or other countries and all northbound traffic is routed to or through NRZ.

Branch lines emanate from the mainline at Palaype running 16 km to Moropule; from Serule running 56 Km to Selebi Phikwe; and from Francistown to 175 Km to Sua Pan. It traffic base is principally minerals, soda ash, salt and coal. In addition to traffic originated or terminated on its lines, it handles significant overhead traffic between Spoornet and NRZ. Mainline trackage is 650 Kms and branchlines total 238. In recent years freight traffic has increased and in each of the last three years BR has reported an operating income, reaching 28 million pula in 1999.

2. CURRENT RAIL TRAFFIC

As the chart below indicates tonnage and revenue have increased over the last several years. Following a decrease in total tonnage and revenues in 1994, 1995 and 1996, the growth rates have been significant since 1997. A major part of this increase has been in transit traffic. With the exception of 1993 when large volumes of foodstuffs moved north for drought relief efforts, transit represented a relatively low percentage of total tonnage. By 1999 that traffic had increased to 1,155,000 tons. Local and import traffic has remained stable, with export traffic increasing to 378,000 tons. Total tonnage moved in 1999 was 2,812,000.

Revenues have followed a similar pattern, reaching 109,370,000 in 1999. Due to the long length of haul, transit traffic is the largest revenue segment of the traffic base, reaching 35,626,000 in 1999. With the opening of the Bulawayo-Breitbridge line in July 1999 with its contractual restriction on routing via Botswana Railways, this traffic has seen a significant decrease. The BBR issue will be discussed later, but clearly the immediate future sees much less traffic for Botswana Railways.

2.1 CURRENT VOLUME FROM 1994 TO 1999

	1994	1,995	1,996	1997	1998	1999
Net Profit/Loss (P million)	(22,180)	(33,170)	(28,600)	27,891	4,516	28,765
Local tons	391	450	447	390	435	489
Average Length of Haul	148	231	242	259	260	258
Net Ton Kilometers	58,000	104,000	108,000	101,000	113,000	126,000
Revenue		14,406	15,710	15,346	18,706	19,868
Revenue per TKm		0.139	0.145	0.152	0.166	0.158
Import Tons	654	653	574	652	809	790
Average Length of Haul	219	194	242	232	262	280
NetTon Kilometers	143,000	127,000	139,000	151,000	212,000	221,000
Revenue		19,255	16,132	20922	27586	30272
Revenue per TKm		0.152	0.116	0.139	0.130	0.137
Export Tons	282	375	389	273	376	378
Average Length of Haul	486	573	540	458	473	524
NetTon Kilometers	137,000	215,000	210,000	125,000	178,000	198,000
Revenue		22,034	25,579	13,580	22,663	23,602
Revenue per TKm		0.102	0.122	0.109	0.127	0.119
Transit Tons	386	281	334	652	948	1,155
Average Length of Haul	640	641	644	641	641	641
Net Ton Kilometers	247,000	180,000	215,000	418,000	608,000	740,000
Revenue		10,941	10,958	23,492	28,860	35,626
Revenue per TKm		0.061	0.051	0.056	0.047	0.048
Total Freight Tons (000)	1,713	1,759	1,745	1,967	2,568	2,812
Total Freight Revenue (000)	60,200	66,640	68,380	73,360	97,820	109,370
Total TKMs (000)	585,000	626,000	672,000	795,000	1,111,000	1,282,000
Average Length of Haul	342	356	385	404	433	456
Total Revenue per TKm	0.103	0.106	0.102	0.092	0.088	0.085
Total Revenue per Ton	35.1	37.9	39.2	37.3	38.1	38.9

3. REVIEW OF CURRENT ASSETS

3.1 INFRASTRUCTURE

A major track rehabilitation program has been undertaken on BR. All mainline sleepers are to be changed from steel to concrete with a spring type fastener. All mainline rail, previously 40 kg per meter is being changed to 50 kg per meter, and all joint connections are welded into Continuous Welded Rail. The rehabilitation program is nearing completion and only a portion between Dibete and Mahalapye remains to be upgraded. That work is in progress and will be finished in the near future. Recent inspection between Gaborone and Mahalapye found the rehabilitated track to be in excellent condition with good ride quality.

The branch lines of BR provide most of the tonnage generated and have been similarly upgraded. The branch from Francistown to Sua Pan was opened in 1992 and was built to high standards, with concrete

sleepers and 40kg rail. It has had recurrent maintenance and does not require rehabilitation. The branch line from Serule to Selebi Phikwe, constructed in 1974, consists of 40kg rail, laid approximately five years ago on steel ties. The branch from Palapye to Moropule, also constructed in 1974, is adequate.

3.2 LOCOMOTIVES

Most of the locomotives observed were General Electric with an average age of more than 20 years. Twelve GE locomotives were acquired in 1983. Twenty GM locomotives acquired in 1986 and are assumed to be in good condition. The fleet is carried on the books at cost, 74,040,000 with accumulated depreciation of 38,595,000. That would indicate that at least part of the fleet has undergone rehabilitation in the past. A reserve of 15,234,000 was set aside in 1999 to rehabilitate older freight locomotives. A major rebuild cost approximately 3,000,000 per locomotive, with lesser cost for less than full rebuild. It is unknown how many of the fleet of 40 owned locomotives will be rebuilt.

3.2.1 PRODUCTIVITY

Locomotive ownership is 40 and with a daily operation of four passenger trains, approximately 30 are assigned to freight service. Assuming 90% of those are available, average ton kilometers produced per available locomotive each day is 130 net ton kilometers (000). This is low by industry standards and should be targeted for improvement. With the rebuild program now scheduled, locomotive fleet should be more than adequate for future needs. Reliability might be enhanced with more rebuilds in the next few years.

3.3 WAGONS

Wagons observed were relatively new and in good mechanical condition. The wagon fleet increased from 223 in 1988 to 1055 in 1991. This included purchase of 570 in 1989 and 284 hopper cars for soda ash, salt and coal in 1992 to service the new line to Sua Pan. With these relatively young cars making up a large part of the fleet they are probably adequate in both number and mechanical condition for the needs of the service.

3.3.1 PRODUCTIVITY

Wagon utilization appears high. Assuming the fleet is used to protect local, export and import traffic, each car makes 38 trips per year, with an average cycle time of less than 10 days. With the export moves of soda ash making up a large portion of the total, the cycle time might be satisfactory, but holds room for improvement.

4. MAJOR TRAFFIC FLOWS

4.1 LOCAL

489,000 tons of local traffic moved in 1999, up slightly over the past few years The average length of haul remains at 258 km. This flow consists of two principal movements, both coal shipments from Moropule to Selebi Phikwe and to Sua Pan. The Selebi Phikwe coal is used by the copper smelter with a trip length of 146 km. The Sua Pan move covers 356 km to move the coal to power the soda ash plant. Both of these movements appear consistent in volume and move as unit trains from Moropule to destination. Revenues are almost 40 per ton with the revenue per ton km of .158 being the most attractive on the BR system. This provides a good core book of business for BR and can be efficiently and economically transported. While its growth potential is limited by the power needs of the two plants, and by world demands for soda ash and copper, it consistently provides good revenue.

4.2 IMPORT

Import traffic has increased slightly to 790,000 tons in 1999. The average length of haul is 280 km and that would indicate that a high portion of the traffic is destined to the Gaborone area. Some fuel oil movements were seen. The revenue on import traffic is also attractive, 38 per ton, for an average of 0.137 per tkm.

4.3 EXPORT

The major portion of the export traffic is the soda ash and salt shipments from Sua Pan moving into South Africa. Regular bi-weekly shipments of 38 to 40 car unit trains are normally handled, with that increasing to 3 per week when product demand is high. This provides a good core business for BR with high revenue due to the long haul, 524-km average, heavy loading and 45 pula per ton. The revenue per tkm is .119.

Export, Import and Local all are dependable sources of traffic and growth can be achieved as the industry penetrates new markets, world economic conditions improve and by gaining increased market share through truck diversion with an improved service package.

4.4 TRANSIT

In the recent past BR has made major improvements in the amount of transit traffic that it transports. From 787,000 tons in 1991 the tonnage has increased to 1,155,000 tons in 1999. The total net tkm share is now over 58% of the total tkm of the BR system. This increase was no doubt due to improved transit times and better service for the long haul traffic. However, this growth trend has ended.

Revenue per ton however is only 31 pula, for this, the longest haul of all the traffic segments. On a revenue per tkm basis the revenues are much lower than the other segments. Revenue per tkm is .048. Compare that with the .158 for local traffic, .137 for import, and .119 for export. What circumstances have given rise to such a disproportionately low rate and why has the growth of this traffic ceased altogether?

5. BULAWAYO – BEITBRIDGE LINE

5.1 BACKGROUND

In July 1999, the line between Bulawayo and Beitbridge was connected. The new connection involved construction of 170 km of new line between Beitbridge and the upgrading of an existing 147-km line from Colleen Bawn and Heany Junction. Total cost of the connection was $85 million USD. This new line provided an alternative route to the then used route from Harare through Bulawayo to Plumtree, thence Botswana Railways for furtherance to Spoornet and South Africa and the other route from Zambia, through Bulawayo to Plumtree, again for furtherance to Spoornet and the various South African destinations. With the opening of the Beitbridge- Bulawayo, line traffic is now moving via that line and no longer moves via Plumtree

The new line was constructed and financed by the private sector on a Build-Operate and Transfer Agreement. The Beitbridge- Bulawayo Railway Limited will operate for thirty -years before transferring ownership to the Government of Zimbabwe.

5.2 COMPETITIVE ASPECTS

In general, providing shippers with alternate routes allows for more competition, eventually improved service and lower costs. With all things being equal, the most efficient route will naturally attract more business. The presence of the BBR, on the face of it, would appear to be a stimulus to improved transit times as the BR and BBR compete for tonnage.

However, the market forces are not free to act, and competition has not been enhanced, but rather it has been stifled by the agreement between the GOZ and BBR. While the total contract hasn't been viewed, it reportedly provides that all traffic moving between South Africa and to or through Zimbabwe, must be routed through BBR, and if it is routed through Botswana Railways, GOZ is to make up for the revenue lost to BBR. In addition it is reported that minimum profit levels are guaranteed to BBR, and it is thus in the best interest of GOZ, to have all NRZ traffic routed via BBR. The new connection, with these agreement provisions, has effectively removed Botswana Railways from participation in traffic moving to or from South Africa and to or from Zimbabwe or points beyond.

The impact of total revenues of BR is significant. Transit traffic accounts for 41% of total tonnage, 58% of work effort (tkm) but only 33% of freight revenue. Because of the relatively low tariff, the contribution to the bottom line is only slightly impacted. Average fuel cost per net tkm is estimated at .012. Car hire is estimated at 1 day per load, average of 30 tons, average haul 641 km, at 60 pula per car day resulting in car hire per tkm of .003. Therefore fuel and car hire cost alone is .015, with revenue of only .048 per net tkm. Add to this the crew wages required over the three crew districts and the return of the empty car and it is at best only marginally profitable. This is due to the large portion of the total revenue that goes to NRZ and to the need to keep tariffs low in order to remain competitive.

6. STRATEGIC RESPONSE OPTIONS

Botswana Railways must accept the fact that the transit traffic will be adversely affected in the near term. Several options are available to it.

6.1 MAXIMIZE BOTTOM LINE WITHOUT THE TRANSIT TRAFFIC

- Concentrate on the traffic that is available, i.e. local, import and export. This traffic moves at adequate rate levels and is dependable year after year.
- Downsize the operating forces to accommodate the reduced level and focus on improving productivity of all resources.
- Improved locomotive productivity can easily be achieved and surplus locomotives, previously used to move transit traffic should be prepared for storage and mothballed, in a secure location, free from temptation to place in service or to scavenge spare parts.
- Focus on increased train size, and to accomplish, explore three day per week service where possible. Fuel savings will follow the reduced train miles.
- Reduce administrative overhead.
- Begin a scheduled track maintenance program that focuses on keeping the track safe for its designed use.

6.2 MAXIMIZE INTERMODAL OPPORTUNITIES

Another option is to explore intermodal traffic, making use of the excellent intermodal facilities at Gabcon and Francon. As the service levels in Zimbabwe continue to deteriorate, alternate methods must be sought. With BR presently handling almost no traffic via Plumtree, it can compete with transfer from rail to highway at Francon.

- Traffic to and from Zambia can move rail from South Africa to Francistown and truck beyond.
- Another option is to move rail to Francistown, truck to Livingstone, and thence rail to destination.
- Zambia currently has no intermodal facility at Livingstone but might be able to quickly get a transfer facility up and running.
- ZRL currently has an idle fleet of container flatcars that could move intermodal containers.
- The service problems in Zimbabwe will only worsen in the near term and an alternative must be found.

6.3 RESPOND IN KIND

Long term, the feasibility of constructing a competing BOT line from near Sua Pan to a new bridge near Kazungula should be explored. As the situation in Zimbabwe worsens, a route that moves direct to Zambia, allows the region to continue to function efficiently and counters the dilemma faced by BR vis a vis the BBR contract.

7. PRIVATIZATION POSSIBILITIES

7.1 ENTERPRISE ATTRACTIVENESS

7.1.1 INFRASTRUCTURE

With the major rehabilitation having been completed, the infrastructure is in excellent condition. A prospective concessionaire would not be faced with the immediate need to invest heavily in infrastructure. This is not usually the case in the privatization of state owned railways. Estimates of investment required to maintain the high quality infrastructure are approximately 23 million pula each year. This places all rail, sleeper and resurfacing programs on a normalized basis with no deferred maintenance.

7.1.2 MARKET OPPORTUNITIES

As set forth above, the local, export and import traffic can support the revenue and investment needs of BR if it is privatized and operated efficiently. Revenue projections based upon conservative growth rates, and assuming only 148,000 tons of transit traffic, generate revenue to allow an attractive return on investment. Opportunities that might exist, such as development of new coal deposits, and additional export moves to South Africa are not considered in revenue projections, but could materialize.

7.1.3 OPERATIONS

A concessionaire would:

- Reduce staff levels.
- Focus on core business and use operating practices proven to work in private railways.
    - Increase train size.
    - Improve locomotive productivity.
- The current dispatching system would be made to function or would be discontinued, utilizing a voice dispatch system in use around the world.
- Examine current wayside detector policy.
- Implementation of RSIS would enable better inventory control, improved transit times and less station and clerical support.
- Use of third party contractors and unit exchange practices would provide for a reliable locomotive fleet with fewer maintenance workers.
- Personnel would be reduced to under 500 to bring to the level required for efficient operation.
    - Botswana Railways currently produce approximately 660 revenue ton miles per employee.
        - KCS, a US class I produced 7,655 revenue ton miles per employee in 1997.
        - Canadian National, A Canadian Railway produced 5,670 revenue ton miles per employee.

7.1.4 PASSENGER SERVICE

Passenger service was excluded from this analysis. Ridership has declined from 722,000 in 1996 to 360,000 in 1999. Passenger revenues are only 10% of the total operating revenues, but account for a significant portion of expense. The railway passenger route is immediately parallel to the highway over the entire route. Bus service can be provided on a more frequent basis and at a greatly reduced cost. Highway buses can provide better service to the many people who now ride the trains from the country to the cities. If the government chooses to continue passenger service via rail, it is assumed that it would fully subsidize the operation, and not negatively affect the concessionaire.

8. BOTSWANA APPROACH TO PRIVATIZATION

With respect to privatization Botswana's position is set forth in its Privatization Policy. It differs from many of the other countries that, due to agreements with international financial institutions, have been hurried towards privatization. For Botswana, "the impetus for privatization has come from a desire to improve efficiency in the delivery of services, to raise the country's growth potential by securing stronger flows of foreign direct investment and technology transfer…"

Botswana believes that "serious consideration will be given to where the private sector should take over functions that can be performed more efficiently through the market mechanisms." Clearly a private sector operator can more efficiently manage the railway, improve service and free the government of the need to provide funds to operate the railway. It is unclear at this time whether the government is inclined to move ahead with privatization in the near term.